SOME NATIVE THERAPEUTIC PLANTS DIPHENYL PICRYL HYDRAZYL (DPPH) RADICAL SCAVENGING ACTIVITY

Syed M. Ali Shah[1*], Irshad Ahmad[2], M. Ashraf[3], Shafia Arshad[4], Muhammad Yar[5], Abida Latif[5] and Muhammad Uzair[6]

Abstract: Oxidative impairment is a vital causative factor involved a few persistent human infections, basically cardiovascular sicknesses, diabetes mellitus, rheumatism and malignancy. In light of the developing curiosity in biology of free radical and the absence of compelling treatments for mainly ongoing infections, the antioxidants value in assurance against these sicknesses is requisite. Antioxidants are synthetic compounds that diminish or prevent oxidation. These can neutralize the damaging impacts of free radicals in tissues and hence are established as safe agents against numerous illnesses like malignant growth, arteriosclerosis and coronary illness. Free radical scavanging activity of *Terminala chebula, Pterocarpus santinalis, Rosa demascena, Symplocos racemosa, Phyllanthus emblica* and *Smilax china* was carried out by DPPH method. For the determination of antioxidant activity, methanolic extracts of different concentrations were used. Result showed that at 1 mg/ml concentration, all these plants expressed 70-98% antioxidant activity in a dose dependent manner.

[1]Department of Eastern Medicine, Directorate of Medical Science, Government College University Faisalabad, Pakistan
[2]Department of Pharmacy, The Islamia University Bahawalpur
[3]Department of Biochemistry & Biotechnology, The Islamia University Bahawalpur
[4]University College of Conventional Medicine, The Islamia University of Bahawalpur, Bahawalpur. Pakistan.
[5]University College of Pharmacy, Punjab University, Lahore. Pakistan.
[6]Faculty of Pharmacy, B.Z. University, Multan. Pakistan.
[*]**Corresponding Author E.mail:** SMAS (smalishah@hotmail.com)

Key Words: Medicinal Plants, DPPH, Antioxidant.

INTRODUCTION

Oxidative impairment is a vital causative factor involved a few persistent human infections, basically cardiovascular sicknesses, diabetes mellitus, rheumatism and malignancy (1,2). In light of the developing curiosity in biology of free radical and the absence of compelling treatments for mainly ongoing infections, the antioxidants value in assurance against these sicknesses is requisite. Antioxidants are synthetic compounds that diminish or prevent oxidation. These can neutralize the damaging impacts of free radicals in tissues and hence are established as safe agents against numerous illnesses like malignant growth, arteriosclerosis and coronary illness (1,3).

Cells of mammalian have expanded defense mechanisms for detoxification of radical. A few antioxidants are of exogenous nature and are gotten from food. Exogenous antioxidants include ß-carotene, L-ascorbic acid, and α-tocopherol. Extensive interest has been centered on the antioxidant compound identification that is pharmacologically strong with no or little side effects for make use of it in protective medication and the food business. The plants chose in the current examination are now utilized as antipyretic, antibacterial, antihyperuricemic, antihelmintic, cardioprotective, antihypercholesterolemic, nephroprotective and gastroprotective specialists in the traditional medicine (4-9).

MATERIALS AND METHODS

Plant Materials and Preparation of Extracts: All plants including *Terminala chebula, Symplocos racemosa, Pterocarpus santinalis, Rosa demascena, Phyllanthus emblica* and *Smilax china* were purchased and authenticated from horticulture. Under shade, all plants were dried to ground into fine powder by using electric grinder. 100 g of ground powder was macerating for two weeks in 400 ml of methanol with occasional

shaking. Then macerated material was filtered by using mira cloth. This course was continual 3 epochs with methanol (200 ml). Under vacuum with rotary evaporator, solvent was evaporated and residue was collected in glass bottles, stored at 4^{o}C.

2,2-diphenyl-1-picrylhydrazyl (DPPH) Antioxidant Assay:

DPPH reduction of radical is a broadly utilized model framework to research the scavenging properties of a few normal mixes. The radical scavenging capabilities were determined by mixing to methanolic solution (1.5 ml) of DPPH (0.1 mM). As reference standard, L-Ascorbic acid was utilized. At 517 nm, absorbance was estimated after 30 min incubation at room temperature (10). The free radical scavenging property was finding out by measure the percent decrease in the DPPH absorbance. The DPPH scavenging activity was measured by the following formula. inhibition (%) = [(Abs of control — Abs of testcomp) / Abs of control] X100

In triplicate, all measurement was performed. Percentage and mean values were calculated.

RESULTS

Symplocos racemosa extract established the significant decreased in the free radical DPPH at dose dependent up to 34.92±0.11, 51.45±0.24, 73.14±0.18, and 94.41±0.12% Respectively, at the 125, 250, 500 and 1000 µg/ml concentration (Figure 1, Table 1). *Terminala chebula* extract showed significant scavenging activity range from 70.10±0.27, 97.88±0.26, 97.75±0.27 and 98.14±0.29 %, respectively, at the 125, 250, 500 and 1000 µg/ml concentration. The results showed this plant has the constituents which exhibited maximal antioxidant activity in its methanolic extract (Table 1). *Pterocarpus santinalis* extract also showed significant scavenging activity ranging from 16.12±0.14, 26.58±0.18, 40.61±0.31 and 70.23±0.25%, respectively at the same studied concentrations (Figure 1, Table 1). *Smilax china* extract showed significant activity ranging from 22.88±0.15, 38.88±0.14, 58.99±0.28 and 93.51±0.19%, respectively, at the concentration of 125, 250, 500 and 1000 µg/ml (Table 1, Figure 1). *Rosa demascena* extract also established the significant activity range from 15.34±0.11, 32.80±0.17, 62.69±0.17 and94.04±0.18%, respectively at the above described concentrations. *Phyllanthus emblica* extracts also showed similar profiles, that is, significant activity ranging from 34.94±0.24, 54.14±0.14, 87.79±0.25 and 96.61±0.27%, respectively, at the above described concentration (Figure 1, Table 1). Thepresent study results revealed that all plants used in the study possessed strong antioxidant property at 0.5 mg/ml and 1mg/ml concentration.

DISCUSSION

Plants are the characteristic wellspring of antioxidants which control the oxidative stress brought about by reactive oxygen species (ROS). Plant, accordingly, signify the liable source of new constituents with potential antioxidant properties. Antioxidant agents help the organisms' to manage oxidative stress, brought about by free radical actuated damage. It is demonstrated that significant levels of ROS cause damage to cells and are associated with infections, for example, disease, joint inflammation, and neurological degeneration, just as quickening the aging process (1). These constituents are powerful against the pernicious ROS impacts (11).

In the current examination, six restorative plants were examined for their antioxidant action by using DPPH method. Various dilutions 0.125 to 1 mg/ml of methanolic extract of curative plants were concentrated on the rate restraint of DPPH as depict (12). At low fixations, plant extract have low concentration of constituents to show free radical scavenging activity. As the extracts

concentration increased, the level of DPPH restraint increased (Table 1, Figure 1). At 517 nm, DPPH methanolic concentrations are strongly colored demonstrating absorption band. DPPH can respond with antioxidants bringing about decolorization of solution. Powerful anticancer action of *Symplocos racemosa* against leukemia and cervical disease has been seen (13). Antioxidant effect of *Pterocarpus santinalis* was completed by free radical scavenging activity and HPTLC fingerprinting strategy (14). Hepatoprotective and antioxidant activities of *Smilax chinensis* root were performed (15).

Rosa damascena flowers had antioxidant and antibacterial properties as seen by (16). *Phyllanthus emblica* established antioxidant action of tannoid standards in constant stress initiated changes in rodent cerebrum (17). Present examination demonstrated solid antioxidant action by hindering DPPH when contrasted with standard L-ascorbic acid. The present results of this investigation showed that the plants utilized in the examination are effectively available source of natural antioxidants. Be that as it may, the phyto-constituents liable for the antioxidant property are at present being explored. In this way, it is recommended that in vivo antioxidant action experiments ought to be performed and work is progressing under these lines.

REFERENCES

1. Halliwell B. Antioxidant defense. Free radicals in biology and medicine. Oxford University Press, USA. 1998.45-50.
2. Pong K. Oxidative stress in neurodegenerative diseases: therapeutic implications for superoxide dismutase mimetics. Expert Opinion on Biological Therapy.2003;3(1):127-139.
3. Bandyopadhyay M, Chakraborty R, Raychaudhuri U. A process for preparing a natural antioxidant enriched dairy product (Sandesh). LWT-Food Science and Technology. 2007;40(5):842-851.
4. Ahmad V, Abbasi M, Hussain H, Muhammad N, Farooq U, Fatima N, Choudhary M. Phenolic glycosides from Symplocos racemosa: natural inhibitors of phosphodiesterase.Phytochemistry.2003;63 (2):217-220.
5. Baliga M, Dsouza J. Amla (Emblica officinalis Gaertn), a wonder berry in the treatment and prevention of cancer. European Journal of Cancer Prevention. 2011;20(3):225-239.
6. Chen L, Yin H, Lan Z, Shuwei Z, Chunfeng Y, Zhonglin L. Anti-hyperuricemic and nephroprotective effects of *Smilax china L*. Journal of Ethnopharmacology. 2011;135(2):399-405.
7. Kumar, N, Ravindranath B, Seshadri T. Terpenoids of Pterocarpus santalinus heartwood. Phytochemistry. 1974. 13(3):633-636.
8. Kundu A, Mahato S. Triterpenoids and their glycosides from Terminalia chebula. Phytochemistry. 1993;32(4):999-1002.
9. Verma R, Padalia R, Chauhan A, Singh A, Yadav A. Volatile constituents of essential oil and rose water of damask rose (Rosa damascena Mill.) cultivars from North Indian hills. Natural Product Research.2011;25(17):1577-1584.
10. Kato K, Terao S, Shimamoto N, Hirata M. Studies on scavengers of active oxygen species. 1. Synthesis and biological activity of 2-O-alkylascorbic acids. Journal of Medicinal Chemistry. 1998;31(4):793-798.
11. Berg D, Youdim M, Riederer P. Redox imbalance. Cell and Tissue Research. 2004;318(1):201-213.
12. Chen N, Chang C, Chang W, Chung S, Yuan-Tay C. Antioxidant and antimicrobial activity of Zingiberaceae plants in Taiwan. Plant Foods for Human Nutrition. 2008;63(1):15-20.

13. Bhuvan R, Jignesh P, Bhavik P, Ashok, G. Potent in vitro anticancer activity of Symplocos racemosa bark. Romanian. Journal of Biology.–Plant Biology. 2009;54(2), 135-140.
14. Arokiyaraj S, Martin S, Perinbam K, Arockianathan P, Marie B. Free radical scavenging activity and HPTLC finger print of *Pterocarpus santalinus L.*-an in vitro study. Indian Journal of Science and Technology. 2008;1(7):1-3.
15. Mandal S, Jana G, Das S, Sahu R, Venkidesh R, Dewanjee S. Hepatoprotective and antioxidant activities of *Smilax chinensis L*. root. Journal of Pharmacology. 2008;2:529-535.
16. Sagdiç O, Baydar N, Baydar H. Antioxidant and antibacterial activities of Rosa damascena flower extracts. Food Science and Technology International.2004;10(4):277-281.
17. Bhattacharya A, Ghosal S, Bhattacharya S. Antioxidant activity of tannoid principles of *Emblica officinalis* (Amla) in chronic stress induced changes in rat brain. Indian Journal of Experimental Biology. 2000;38(9):877-880.

Table 1: **Percent inhibition of six medicinal plants showing antioxidant activity(mean ± s.d., n =3).**

Sr. No.	Botanical Name	Common Name	Family	Part used	Percent inhibition			
					1.00 mg/ml	0.500 mg/ml	0.250 mg/ml	0.125 mg/ml
1	*Symplocos racemosa*	*Lodh pathani*	Symplocacea	*Bark*	94.41 ± 0.12	73.14 ± 0.18	51.45 ± 0.24	34.92 ± 0.11
2	*Terminala chebula*	*Bahera*	Combretaceae	*Fruit*	98.14 ± 0.29	97.75 ± 0.27	97.88 ± 0.26	70.10 ± 0.27
3	*Pterocarpus santinalis*	*Sandal Surkh*	Fabaceae	*Heart-wood*	70.23 ± 0.25	40.61 ± 0.31	26.58 ± 0.18	16.12 ± 0.14
4	*Smilax china*	*Chob chini*	Smilaceae	*Rhizomes*	93.51 ± 0.19	58.99 ± 0.28	38.88 ± 0.14	22.88 ± 0.15
5	*Rosa demascena*	*Gul-e-Surkh*	Asteraceae	*Petals*	94.04 ± 0.18	62.69 ± 0.17	32.80 ± 0.17	15.34 ± 0.11
6	*Phyllanthus emblica*	*Amla*	Euphorbiaceae	*Fruit*	96.61 ± 0.27	87.79 ± 0.25	54.14 ± 0.14	34.94 ± 0.24
7	*L-Ascorbic acid*	Vitamin C		-	92.62 ± 0.28	-	-	-

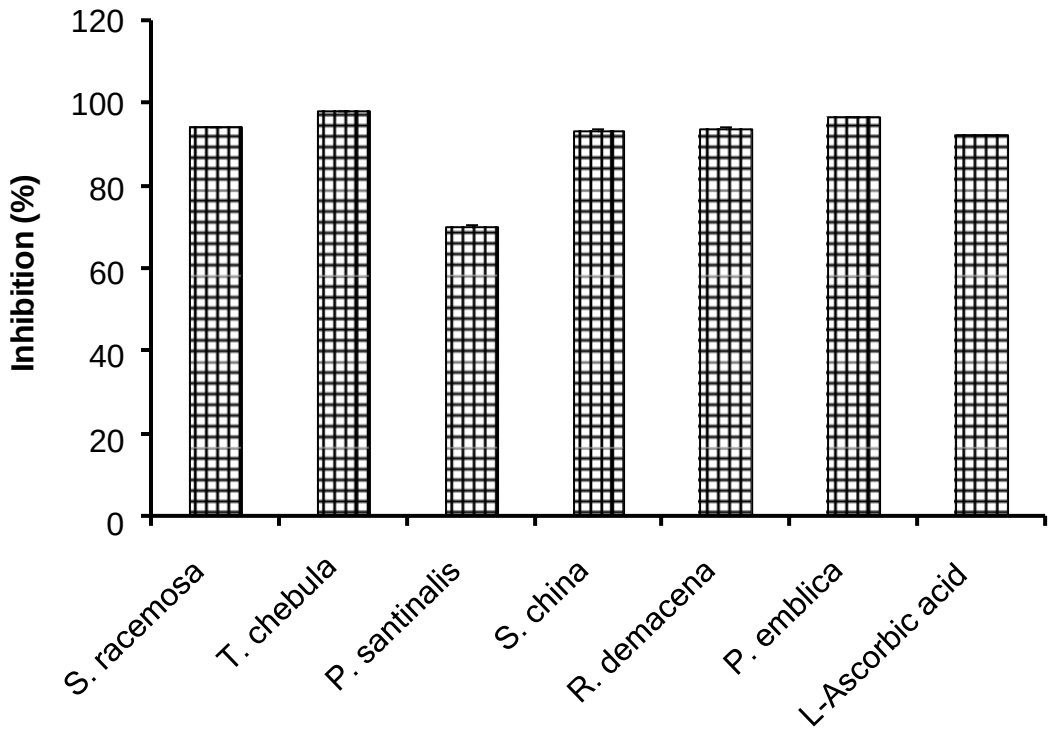

Figure 1: Antioxidant activity at 1mg/ml plant extract (n=3, error is <5%).